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| EXAMINER | |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/661,322 | PARIDA ET AL. | |
| | Examiner | Art Unit | |
| | PETER COUGHLAN | 2129 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *06 October 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *9/21/2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

# Detailed Action

1. This office action is in response to an AMENDMENT entered October 6, 2008 for the patent application 10/661322 filed on September 12, 2004.

2. All previous Office Actions are fully incorporated into this Final Office Action by reference.

3. Examiner's Comment: Although, the terms 'carrier wave' or 'carrier signal' is not specifically mentioned within the specification, the Examiner will exclude these interpretations wherein the context of 'machine readable medium' is disclosed.

## ***Status of Claims***

4. Claims 1-35 are pending.

5. Examiner's comment:

Reviewing the R.C.E. for application 10/661322, the Examiner noted there were no amended claims accompanying the documentation. The Examiner called the firm of Ryan Mason and Lewis and inquired about the possible missing set of amended claims on Thursday 11/20/2008. Mr. Mason (Reg. No. 36597) returned my message on Monday 11/24/2008 and stated there were no amended claims to be sent.

### *Specification Objection*

6. The amendment filed 10/03/2007 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: The original specification pertains only to discovering permutation patterns with a domain of being an 'abstract problem.' By crossing out 'abstract' the applicant is introducing problems that are both 'abstract' and other domains as well. (page 3:16-26) On page 2:4 through page 3:14 describes applications which are not based in 'abstract problem' solving domain which was presented in the original specification.

Applicant is required to cancel the new matter in the reply to this Office Action.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1 through 35 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter

which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. These claim state the ability to 'process co-located elements discovered in said input string.' The term 'co-located element' is not defined or even mentioned within the specification.

These claims must be amended or withdrawn from consideration.

Claims 31, 33, 35 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. These claims state that relationship is functional. This is not described within the specification. There is no definition of 'functional relationship.' In fact, using the excepted definition of a function, the relationship is not functional.

For example the lets assign the following permutation patterns a set of labels.

| Pattern | Label |
|---|---|
| 2, 1 | 2 |
| 1, 1 | 3 |
| 1, 2 | 4 |
| 2, 3 | 5 |
| 4, 3 | 6 |
| 3, 2 | 7 |
| 3, 4 | 8 |

Then the following permutation patterns will be relabeled.

| Pattern | Label |
|---|---|
| 2, 1, 1, 1 | 5 |
| 1, 2, 1, 1 | 6 |
| 1, 1, 2, 1 | 7 |
| 1, 1, 1, 2 | 8 |

So what is the practical application in relabeling the permutation of 1, 2, 1, 1 into 6? Considering the permutation pattern already has a label of 1, 2, 1, 1.

Let's add the following assignment of permutation patterns and label set

| Pattern | Label |
|---|---|
| 0, 0 | 9 |
| 9, 9 | 10 |
| 6, 10 | 11 |

This result with the following permutation pattern of 1, 2, 1, 1, 0, 0, 0, 0 is labeled as 11.

Summarizing

| Pattern | Label |
|---|---|
| 1, 2, 1, 1 | 6 |
| 1, 2, 1, 1, 0, 0, 0, 0 | 11 |

Thus with 1 'a' component, 2 'b' components, 1 'c' component and 1 'd' component as a permutation pattern results in 2 different labels and thus is not functional.

These claims must be amended or withdrawn from consideration.

Claims 30, 32, 34 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to

one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. These claims state that the 'relationship is 'structural.' 'The word 'structural' is not mentioned within the specification and is not a common term within the art. The Examiner has no idea what is meant by 'structural.'

These claims must be amended or withdrawn from consideration.

***35 USC § 101***

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-35 are rejected under 35 U.S.C. 101 for nonstatutory subject matter. The computer system must set forth a practical application of that § 101 judicial exception to produce a real-world result. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77. The invention is ineligible because it has not been limited to a substantial practical application. The application is an algorithm that searches for patterns along a one-dimensional array. There has to be an application for this method to be employed with to have a useful purpose. Additionally, the claims describe preemption. The statement 'providing said permutation patterns for utilization in said application that processes said relationship between said groups of said characters identified by said permutation patterns' describe no specific application. This statement describes the use of the

invention can be used for any application that processes a relationship between groups of characters. 'Utilization in an application' means 'utilization' in any application' thus disclosing preemption. 'Characters' are not limited to a specific application thus disclosing preemption.

The claims are also rejected under lack of concreteness. As explained above the permutation pattern of 1, 2, 1, 1 has a different result from the permutation pattern of 1, 2, 1, 1, 0, 0, 0, 0. Both have the same number of permutations within a specific index

In determining whether the claim is for a "practical application," the focus is not on whether the steps taken to achieve a particular result are useful, tangible and concrete, but rather that the final result achieved by the claimed invention is "useful, tangible and concrete." If the claim is directed to a practical application of the § 101 judicial exception producing a result tied to the physical world that does not preempt the judicial exception, then the claim meets the statutory requirement of 35 U.S.C. § 101.

However, the portions of the opinions in State Street and AT&T relying solely on a "useful, concrete and tangible" result analysis *should no longer be relied on*. Ex parte Bilski, Appeal No. 2007-1130 (Fed. Cir. October 30, 2008.

The court has said that there's a two-pronged test to determine whether a software of business method process patent is valid: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing. In other words, pure software or business method patents that are neither tied to a specific machine nor change something into a different state are not patentable. Ex parte Bilski, Appeal No. 2007-1130 (Fed. Cir. October 30, 2008).

The application describes open ended uses which is equivalent to preemption. There must be one invention per application.

Finding patterns in strings at an academic level is not clear in its purpose or scope. There has to be a reason for finding such strings and their usefulness in a real world application, is questioned. The application as it stands is strictly an academic exercise with no useful and tangible function and/or result.

The invention must be for a practical application and either:

1) specify transforming (physical thing) or

2) have the FINAL RESULT (not the steps) achieve or produce a

useful (specific, substantial, AND credible),

concrete (substantially repeatable/ non-unpredictable), AND

tangible (real world/ non-abstract) result.

Claims that recite an algorithm with given parameters with no reason why and no stated use are not statutory.

Claims that recite preemption are non-statutory and must be amended to limit the practical application to a single purpose or function.

Claims that lack concreteness are non-statutory under 35 U.S.C. §101.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-17, 20-26, 29, 30-35 are rejected under 35 U.S.C. 102(b) (hereinafter referred to as **Floratos**) being anticipated by Floratos, 'DELPHI: A pattern-based method for detecting sequence similarity'.

Claim 1.

Floratos anticipates selecting a new portion of the input string, the new portion differing from a previously selected portion of the input string by at least one new character of the input string (**Floratos,** p457 C1:26 through C2:4; 'Window size' of applicant is equivalent to 'W' of Floratos. When is search mode the method searches at strings of width W. Since a string is being searched this is done by inputting a new portion of the string on one end of the width and removing an old portion at the other end of the width. Must like a window of size 'W' moving down a one-dimensional array. ); determining one or more values for how many of the at least one new character are in the portion of the input string (**Floratos,** p457 C1:26 through C2:4; 'Determining one or more values' of applicant is equivalent to 'L' of Floratos. Where 'L' is the number of matches in a pattern query 'Q'); determining which, if any, names in a plurality of sets of names have changed by selection of the new portion, the plurality of sets comprising a first set and a plurality of additional sets, wherein the first set corresponds to all of the characters in the alphabet and to values of how many of the characters of the alphabet are in the previously selected portion, wherein the values are names for the first set,

and wherein each additional set comprises names corresponding to selected pairs of names from a single other set (**Floratos,** p457 C2:5-15; 'First set' of applicant is equivalent to 'query sequence (Q)' of Floratos. 'Additional sets' of applicant is equivalent to matches of 'Q' 'Single other set' of applicant is equivalent to 'D' of Floratos.); and using changes in the names to determine the permutation patterns; (**Floratos,** p457 C1:26-43; Each 'permutation patterns' of applicant is disclosed by the algorithm which produces as output the complete set of all of the maximal (L, W) patterns that appear in at least K of the sequences in the set D of Floratos.) and providing said permutation patterns for utilization in said application that processes co-located elements discovered in said input string and that process said relationship between said groups of said characters identified by said permutation patterns. (**Floratos,** abstract; 'Utilization' of applicant is illustrated by the 'discovery [of] weak but biologically important similarities' of Floratos.)

Claims 2 and 21.

Floratos anticipates the at least one processor (**Floratos,** p471, C1:6-32) is further configured, in order to determine the plurality of levels (**Floratos,** p457, C1:26-43; 'Plurality of levels' determination is preformed by 'level of our pattern discovery algorithm' of Floratos.): to determine the first set by determining values of how many of each of the characters of the alphabet are in the previously selected portion (**Floratos,** C457, C1:26-43; 'How many of each characters' of applicant is equivalent to 'density' of Floratos.); and to determine the additional sets by assigning names for a given

additional set to selected pairs of names from another of the sets, wherein each assigned name is unique to the names for a selected pair. (**Floratos,** p456 C2:44 through p457 C1:7; 'Assigning names' of applicant is equivalent to 'offset list' of Floratos.)

Claim 3.

Floratos anticipates wherein the assigned names are codes. (**Floratos,** p456, C2:20-38; In this example the code is ("A.CH..E"))

Claim 4.

Floratos anticipates wherein the codes are natural numbers. (**Floratos,** p457, C1:17-25; Floratos illustrates the 'backbone' which indicates the importance of location among the query pattern. For example the 'backbone' of the sample in claim 3 would be "1011001".)

Claims 5 and 22.

Floratos anticipates wherein the at least one processor (**Floratos,** p471, C1:6-32) is further configured, when determining which, if any, names in a plurality of sets of names have changed determines that a name has changed to determine that a new name is needed for the changed name. (**Floratos,** p457 C2:44 through p458 C2:15; 'Set of names' of applicant is equivalent to 'π' (or set of <L, W> patterns). The process of 'determining' of applicant is equivalent to 'pattern matching' of Floratos.)

Claim 6.

Floratos anticipates wherein the step of determining which, if any, names in a plurality of sets of names have changed further comprises the step of selecting a new name, not currently in use in the sets of names, for the changed name. (**Floratos,** p458 C1:5 through C2:15 and Figure 1; This pertains to the generation of hash values for every substring. 'New name' of applicant is equivalent to 'hash value' of Floratos.)

Claims 7 and 23.

Floratos anticipates wherein the at least one processor (**Floratos,** p471, C1:6-32) is further configured to determine, for a name that has changed in the sets of names, a location in the input string that corresponds to the changed name. (**Floratos,** p458 C1:5 through C2:32 and Figure 2; A hash table will 'point' to a particular list of offsets of a substring.)

Claim 8.

Floratos anticipates wherein the changed name corresponds to at least two characters of the input string and a location in the input string of a given character of the at least two characters is chosen as the determined location. (**Floratos,** Figures 1 and 2; The generation of hash values is based at least two characters and using the hash values to generate a hash table which 'points' to the beginning of a substring.)

Claims 9 and 24.

Floratos anticipates wherein each of the names in the sets of names corresponds to a pattern, and wherein the at least one processor (**Floratos,** p471, C1:6-32) is further configured, when using changes in the names, to select permutation patterns from the patterns. (**Floratos,** p458 C2:16-32; 'Select permutation patterns' of applicant is equivalent to finding two residues of a substring.)

Claim 10.

Floratos anticipates the step of comparing names that have changed in the sets of names to a database comprising a plurality of stored names. (**Floratos,** p458 C2:46 through p459 C1:4; Floratos illustrates comparing two names that share the same location.)

Claims 11 and 25.

Floratos anticipates wherein the additional sets have names corresponding to only a single pair of names from another set. (**Floratos,** p459, C1:5-22; The 'pair of names' of applicant are 'chained' by Floratos resulting in 'additional sets' of applicant.)

Claims 12 and 26.

Floratos anticipates wherein the at least one processor (**Floratos,** p471, C1:6-32) is further configured, when using changes in the names to determine permutation patterns, to correlate the changed names with permutation patterns. (**Floratos,** p457

C2:44 through p458 C2:32; 'Determine permutation patterns' and 'correlate' of applicant is equivalent to 'searching' and 'pattern matching' of Floratos.)

Claim 13.

Floratos anticipates wherein the step of determining which, if any, names in a plurality of sets of names further comprises, for each changed name, updating a count corresponding to that changed name (**Floratos,** p458 C2:16-32; 'Updating count' of applicant is equivalent to 'increment by one' of Floratos.), and wherein the method further comprises the step of: performing the steps of selecting, determining one or more values, and determining which, if any, names in a plurality of sets of names until the entire input string has been selected. (**Floratos,** p458 C2:16-32; 'Until the entire input string' of applicant is equivalent to when the counter C, is C[i] equals (n-1) of Floratos.)

Claim 14.

Floratos anticipates wherein portions selected have a predetermined size, and wherein the method further comprises the step of selecting a number of predetermined sizes and performing the steps of selecting, determining one or more values, and determining which, if any, names in a plurality of sets of names for each of the predetermined sizes. (**Floratos,** p459 C2:18 through p460 C1:7; 'Determining one of more values' of applicant is equivalent to 'L, W and $K_{min}$' of Floratos.)

Claim 15.

Floratos anticipates wherein the step of using changes further comprises the step of determining permutation patterns corresponding to counts greater than or equal to a predetermined count. (**Floratos,** p462 C2:5 through p463 C1:17; Here Floratos illustrates an example of permutation patterns where $k_{min} = 15$ and only patterns with support of 15 or higher are counted.)

Claim 16.

Floratos anticipates the step of determining maximal permutation patterns from the determined permutation patterns. (**Floratos,** p457 C1:8-14)

Claim 17.

Floratos anticipates the step of determining which, if any, names in a plurality of sets of names further comprises the step of determining location lists for each of the names corresponding to permutation patterns (**Floratos,** p458 C1:5 through C2:32 and Figure 2; 'Location lists' of applicant is equivalent to 'hash table' of Floratos.), and wherein the step of determining maximal permutation patterns further comprises the steps of comparing location lists for permutation patterns and eliminating duplicate permutation patterns by using the location lists. (**Floratos,** p458 C2:33 through p459 C1:22; 'Eliminating duplicate permutation patterns' of applicant is accomplished by 'chaining' of Floratos.)

Claim 20.

Floratos anticipates a memory (**Floratos,** p471, C1:6-32) ; at least one processor coupled to the memory, the at least one processor configured: to select a new portion of the input string, the new portion differing from a previously selected portion of the input string by at least one new character of the input string (**Floratos,** p457 C1:26 through C2:4; 'Window size' of applicant is equivalent to 'W' of Floratos. When is search mode the method searches at strings of width W. Since a string is being searched this is done by inputting a new portion of the string on one end of the width and removing an old portion at the other end of the width. Must like a window of size 'W' moving down a one-dimensional array. ); to determine one or more values for how many of the at least one new character are in the portion of the input string (**Floratos,** p457 C1:26 through C2:4; 'Determining one or more values' of applicant is equivalent to 'L' of Floratos. Where 'L' is the number of matches in a pattern query 'Q'); determine which, if any, names in a plurality of sets of names have changed by selection of the new portion, the plurality of sets comprising a first set and a plurality of additional sets, wherein the first set corresponds to all of the characters in the alphabet and to values of how many of the characters of the alphabet are in the previously selected portion, wherein the values are names for the first set, and wherein each additional set comprises names corresponding to selected pairs of names from a single other set (**Floratos,** p457 C2:5-15; 'First set' of applicant is equivalent to 'query sequence (Q)' of Floratos. 'Additional sets' of applicant is equivalent to matches of 'Q' 'Single other set' of applicant is equivalent to 'D' of Floratos.); and to use changes in the names to determine the

permutation patterns. (**Floratos,** p457 C1:26-43; Each 'permutation patterns' of applicant is disclosed by the algorithm which produces as output the complete set of all of the maximal (L, W) patterns that appear in at least K of the sequences in the set D of Floratos.) and providing said permutation patterns for utilization in said application that processes co-located elements discovered in said input string and that process said relationship between said groups of said characters identified by said permutation patterns. (**Floratos,** abstract; 'Utilization' of applicant is illustrated by the 'discovery [of] weak but biologically important similarities' of Floratos.)

Claim 29.

Floratos anticipates a computer readable medium (**Floratos,** p471, C1:6-32) containing one or more programs which when executed implement the steps of: selecting a new portion of the input string, the new portion differing from a previously selected portion of the input string by at least one new character of the input string (**Floratos,** p457 C1:26 through C2:4; 'Window size' of applicant is equivalent to 'W' of Floratos. When is search mode the method searches at strings of width W. Since a string is being searched this is done by inputting a new portion of the string on one end of the width and removing an old portion at the other end of the width. Must like a window of size 'W' moving down a one-dimensional array. ); determining one or more values for how many of the at least one new character are in the portion of the input string (**Floratos,** p457 C1:26 through C2:4; 'Determining one or more values' of applicant is equivalent to 'L' of Floratos. Where 'L' is the number of matches in a pattern

query 'Q'); determining which, if any, names in a plurality of sets of names have changed by selection of the new portion, the plurality of sets comprising a first set and a plurality of additional sets, wherein the first set corresponds to all of the characters in the alphabet and to values of how many of the characters of the alphabet are in the previously selected portion, wherein the values are names for the first set, and wherein each additional set comprises names corresponding to selected pairs of names from a single other set (**Floratos,** p457 C2:5-15; 'First set' of applicant is equivalent to 'query sequence (Q)' of Floratos. 'Additional sets' of applicant is equivalent to matches of 'Q' 'Single other set' of applicant is equivalent to 'D' of Floratos.); and using changes in the names to determine the permutation patterns. (**Floratos,** p457 C1:26-43; Each 'permutation patterns' of applicant is disclosed by the algorithm which produces as output the complete set of all of the maximal (L, W) patterns that appear in at least K of the sequences in the set D of Floratos.) and providing said permutation patterns for utilization in said application that processes co-located elements discovered in said input string and that process said relationship between said groups of said characters identified by said permutation patterns. (**Floratos,** abstract; 'Utilization' of applicant is illustrated by the 'discovery [of] weak but biologically important similarities' of Floratos.)

Claims 30, 32, 34

Floratos anticipates wherein the relationship is structural. (**Floratos,** p456, C2:20-38; 'Structural' of applicant is equivalent to ''structural' of Floratos.)

Claims 31, 33, 35

Floratos anticipates wherein the relationship is functional. (**Floratos,** p456, C2:20-38; 'Functional' of applicant is equivalent to 'functional' of Floratos.)

***Response to Arguments***

7. Applicant's arguments filed on October 6, 2008 for claims 1-35 have been fully considered but are not persuasive.

8. In reference to the Applicant's argument:

REMARKS

This Voluntary Amendment is submitted in response to the outstanding Advisory Action, dated September 23, 2008. The present application was tiled on September 12, 2003 with claims 1 through 29. Claims 30-35 were added in the Voluntary Amendment dated October 3, 2007. Claims 1 through 35 are presently pending in the above-identified patent application.

This amendment is submitted pursuant to 37 CFR §1.116 and should be entered. In particular. the amendment deletes a statement in the Introduction section of the Detailed Description. The Amendment places all of the pending claims, i.e., claims 1 through 35, in a form that is believed allowable, and, in any event, in a better form for appeal. It is believed that examination of the pending claims as amended, which are consistent with the previous record herein, will not place any substantial burden on the Examiner. In any case, a Request for Continued Examination is being submitted herewith.

In the present Office Action, the Examiner objected to the amendment filed on October 3, 2007 under 35 U.S.C. §132(a) because it introduces new matter into the disclosure and rejected claims I, 20, and 29-35 under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. The Examiner rejected claims 1-35 under 35 U.S.C. §101 for nonstatutory subject matter,

and rejected claims 1-17, 20-26, and 29-35 under 35 U.S.C. § 102(b) as being anticipated by Floratos, "DELPHI: A Pattern-based Method for Detecting Sequence Similarity."

Formal Objections

The Examiner objected to the amendment filed on October 3, 2007 under 35 U.S.C. §I 32(a) because it introduces new matter into the disclosure. In particular, the Examiner asserts that. by crossing out the word "abstract," the Applicant is introducing problems that are both "abstract" and other domains as well (page 3, lines 16-26). The Examiner asserts that pages 2-3 describe applications which are not based in an "abstract problem" solving domain which was presented in the original specification.

Applicants note that the original disclosure teaches that "the abstract problem of discovering permutation patterns is formed as a discovery problem." (Page 4, lines 7-10.) The adjective "abstract" referred to the "problem of discovering permutation patterns." Contrary to the Examiner's assertions, the adjective "abstract" did not refer to the domains to which the discovery of permutation patterns applied nor to the disclosed invention. The Examiner, however, is attempting to utilize this statement as evidence that the invention is directed to non-statutory subject matter. The Examiner is also attempting to use the deletion of the statement, as evidence that the invention is directed to non-statutory subject matter. This is contradictory: if the statement is the cause for introduction of the alleged "abstract problems," then the deletion of the statement will remove the alleged "abstract problems" from consideration.

A person of ordinary skill in the art would also recognize that the claimed invention is applicable to many domains, including those cited by the Examiner (as described on pages 2-3).

Furthermore, the present disclosure teaches that:
It is to be understood that these and other embodiments and variations shown and described in the examples set forth above and the figures herein are Merely illustrative of the principles of this invention and that various modifications may be implemented by those skilled in the art without departing from the scope and spirit of the invention. (Page 14, lines 13-16)

Thus, the claimed invention is not limited to the exemplary problems and embodiments described in the specification. In the Advisory Action, the Examiner asserts that this statement supports the Examiner's position. Appellants maintain that this statement was provided to indicate that there are a variety of statutory embodiments and domains for the invention.

Finally, regarding the Examiner's assertion that the phrase "problem of discovering permutation patterns" introduces new matter, Applicants note that the cited phrase has been deleted. Applicants maintain that the deletion of the original phrase ("the abstract problem of discovering permutation patterns is formed as a discovery problem called the pattern problem") does not and cannot introduce new matter and does not and cannot introduce problems, either abstract or from other domains. Moreover, Applicants note that the cited phrase is directed to the problem being solved and not to the solution or invention being claimed.

Thus, Applicants respectfully request that the objection under 35 U.S.C. §132(a) be withdrawn.

Examiner's response:

Applicant makes the argument 'the abstract problem of discovering permutation patterns is formed as a discovery problem.' (Page 4, lines 7-10.) The adjective "abstract" referred to the "problem of discovering permutation patterns." Contrary to the Examiner's assertions, the adjective "abstract" did not refer to the domains to which the discovery of permutation patterns applied nor to the disclosed invention." The domain of the statement is 'the abstract problem of discovering permutation patterns is formed', and the range of the statement is 'as a discovery problem.' The striking out the word 'abstract' within the specification results in the introduction of other domains and thus the introduction of new matter.

9. In reference to the Applicant's argument:

Section 112 Rejections

Claims 30-35 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Regarding claims 1, 20, and 29, the Examiner asserts that the term 'co-located element' is not defined or mentioned within the specification. Regarding claims 31, 33, and 35, the Examiner notes that these claims recite that the relationship is functional, and asserts that there is no definition of

"functional relationship" and that, using the excepted definition of a function, the relationship is not functional. Regarding claims 30, 32, and 34, the Examiner notes that these claims recite that the relationship is structural, and asserts that the word "structural" is not recited within the specification and is not a common term within the art. The Examiner further asserts that "one of many possibilities of what 'structural' could be (is) an algorithm."

Regarding the Examiner's assertion that the term 'co-located element' is not defined or mentioned within the specification, Applicants note that "colocated" is defined as "to locate or be located in jointly or together." (See, dictionary.com) Thus, a person of ordinary skill in the art would recognize that the term "co-located elements" are elements that are located jointly or together. In the Advisory Action, the Examiner asserts that the specification is silent regarding what the cited term means regarding the invention. A person of ordinary skill in the art would recognize, however, that the cited term is well known and refers to elements that are located jointly or together. In addition, claim 1, for example, requires processing co-located elements discovered in said input string. The elements that are selected as co-located elements for processing are a design choice, as would be apparent to a person of ordinary skill in the art.

Applicants maintain that the terms "functional relationship" and "structural relationship" are well understood by a person of ordinary skill in the art. For example, the terms "structural" or "functional" are a rationale for looking at permutation patterns of, for instance, genes or protein domains in amino acid sequences, i.e., genes that appear in a completely different order. These genes may have structural and/or functional relations, although they may appear in different orders in the chromosomes.

Regarding the Examiner's assertion that "one of many possibilities of what 'structural' could be (is) an algorithm," Applicants again note that the term "structural" is well known; it is an adjective, and therefore cannot be an algorithm.

Regarding the Examiner's assertion in the Advisory Action that, if the Applicant uses FIGS. 3A-B to define 'structural,' then it is functional "due to the fact that each level is dependent on the lower level and only result can be obtained for a given lower level input."

Contrary to the Examiner's assertion, Applicants are not referring to FIGS. 3A or 3B in regard to the meaning of the term "structural relationship." As was argued above, the term "structural relationship" refers to the rationale for looking at permutations of, for example, genes or protein domains in amino acid sequences, in order to discover their structural relationships.

Thus, Applicants respectfully request that the section 112 rejections be withdrawn.

Examiner's response:

Applicant recites dictionary.com as the reference for the rejection of the term 'co-located.' Dictionary.com is not mentioned within the specification as a reference. This reference states the meaning to be 'to locate or be located in jointly or together.' If this language was used within the claims, the Examiner would have rejected them as a relative term. What would it mean to have elements being 'locate or be located in jointly or together?' It is a vague term which the Examiner feels could have clarified using language known within the art.

Applicant argues 'terms "functional relationship" and "structural relationship" are well understood by a person of ordinary skill in the art.' They are not. In addition, the Examiner illustrated (under U.S.C. ¶112 rejection) that the method described by the application is not a function. Using the applicants reasoning, a 'functional relationship' is not a function. 'Structural relationship' is not defined within the specification.

10. In reference to the Applicant's argument:

Section 101 Rejections

Claims 1-35 were rejected under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter. In particular, the Examiner asserts that the invention has not been limited to a substantial practical application and that the claims describe preemption. The Examiner asserts that the phrase "utilization in an application" means "utilization in any application" thus disclosing preemption and that "characters" are not limited to a specific application thus disclosing preemption.

In the Response to Arguments section of the present Office Action, the Examiner asserts that the statement "the existence of additional unknown uses for the invention has no relevance to the validity of the claims under section 101" is contrary to MPEP 2106. In the Examiner's Answer dated August 3, 2007, the Examiner asserted that the claims fail to provide a tangible result, and notes that there must be a practical application. The Examiner asserted that 1) the Appellant admits to unknown uses for the invention; 2) relies on "Background" to supply a practical application of the invention; and 3) admits (in paragraph 0019) that the invention is an 'abstract problem.'

Regarding the Examiner's assertion that the statement is contrary to MPEP 2106, Applicants find no comments in MPEP 2106 regarding "unknown uses" for an invention that are in addition to the disclosed uses of an invention. Applicants note that any invention may have, in addition to the known uses, other unknown uses.

Regarding the Examiner's assertion that the Applicant admits to unknown uses for the invention, Applicants note that, as described below, the disclosure clearly identifies practical applications of the invention. The existence of additional unknown uses for the invention has no relevance to the validity of the claims under section 101. In addition, independent claims 1, 20, and 29 have been amended to require providing said permutation patterns for utilization in an application that processes co-located elements discovered in said input string and that processes a relationship between groups of said characters identified by said permutation patterns. Applicants maintain that this amendment limits the claims to a practical application.

Examiner's response:

The invention takes an input and simply renames it.

11. In reference to the Applicant's argument:

Regarding the Examiner's assertion that the Applicant relies on "Background" to supply a practical application of the invention, please note that the specification has also been amended to include the practical application(s) (as disclosed in the "Background" section) in the -Detailed Description" section. Contrary to the Examiner's assertion, the cited amendment places the description of a gene analysis application in the Detailed Description section of the application and therefore

provides guidance for an exemplary practical application of at least one aspect of the present invention. Furthermore, contrary to the Examiner's assertion, the cited amendment does not introduce new matter as the gene analysis application is clearly disclosed in the original application and is a domain to which the present invention is directed (see, page 2, lines 21-23, of the originally filed disclosure).

Regarding the Examiner's assertion that the Applicant admits (in paragraph 0019) that the invention is an 'abstract problem,' Applicants note that the term "abstract" was used in a technical sense, and not as a legal admission in the context of statutory subject matter, i.e., the term -abstract" is not a characterization of the invention that is claimed. Furthermore, the adjective "abstract" did not refer to the domains to which the discovery of permutation patterns is applied. In any case, the specification has been amended to delete the statement that "the problem of discovering permutation patterns is formed as a discovery problem called the pattern problem" in paragraph 0019. As noted above, Applicants maintain that the deletion of the cited phrase does not introduce new matter and does not and cannot introduce problems, either abstract or from other domains.

Regarding the Examiner's assertion that Applicant's argument that the "existence of additional unknown uses for an invention" is an admission of preemption, Applicants note that this is a general statement of fact that applies to all patent applications and is not an admission of preemption.

Regarding the Examiner's assertion that the statement that "genes that appear together consistently across genomes are believed to be functionally related" is evidence that the 'real world' application is based on 'belief and not facts, Applicants note that the cited statement has led to new research and development in, for example, the analysis and identification of genes and, contrary to the Examiner's assertion, is evidence of a "real world" application.

Examiner's response:

The Examiner objected to this specification amendment in the 12/5/2007 Office Action. The original specification states 'In this disclosure, the abstract problem of discovering permutation patterns is formed as a discovery problem called the π pattern problem and techniques that automatically discover permutations patterns in, for

instance, multiple input patterns are given.' This is the domain and range of the invention.

Applicant argues the term 'abstract' was used in the 'technical sense.' The Examiner has no idea what the 'technical sense' of 'abstract' is. Since this application is set within the abstract domain, there could be numerous applications in which this could be employed.

Applicant makes the statement 'the cited statement has led to new research and development in, for example, the analysis and identification of genes and, contrary to the Examiner's assertion, is evidence of a "real world" application.' Paragraph[0004] states 'As the available number of complete genome sequences of organisms grows, it becomes a fertile ground for investigation along the direction of detecting gene clusters by comparative analysis of the genomes. A gene G is compared with its orthologs G' in the different organism genomes. Even phylogenetically close species are not immune from gene shuffling, such as in Haemophilus influenzae and Escherichia Coli. Also, a multicistronic gene cluster sometimes results from horizontal transfer between species and multiple genes in a bacterial operon fuse into a single gene encoding multi-domain protein in eukaryotic genomes.' This has no relationship to renaming input.

12. In reference to the Applicant's argument:

Finally, as previously noted, the Supreme Court has stated that the "Transformation and reduction of an article 'to a different state or thing' is the clue to patentability of a process claim." Gottshalk v. Benson, 409 U.S. 63, 70, 175 U.S.P.Q. (BNA) 676 (1972). In other words, claims that require some kind

of transformation of subject matter, which has been held to include intangible subject matter, such as data or signals, that are representative of or constitute physical activity or objects have been held to comply with Section 101. See, for example, In re Warmerdam, 31 U.S.P.Q.2d (BNA) 1754, 1759 n.5 (Fed. Cir. 1994) or In re Schrader, 22 F.3d 290, 295, 30 U.S.P.Q.2d (BNA) 1455, 1459 n.12 (Fed. Cir. 1994).

Thus, as expressly set forth in each of the independent claims, the claimed methods or system describe discovering permutation patterns from an input string having a plurality of characters, each character being from an alphabet, and transform the input string to permutation patterns. This transformation to permutation patterns provides a useful, concrete and tangible result. For example, the Background and Detailed Description sections of the present disclosure describe how such permutation patterns are utilized in medical applications related to genes and proteins. Thus, contrary to the Examiner's assertion that no function or application has been stated for the invention, Applicants note that the Background and Detailed Description sections of the present disclosure describe how such permutation patterns are utilized in medical applications related to genes and proteins (see, page 1, line 12, to page 2, line 20). The final result of the cited claims, i.e., permutation patterns, are useful, concrete and tangible results.

Regarding the Examiner's assertion that the claimed invention returns a number that only has an abstract function, Applicants note that, as described numerous times above, the claimed invention transforms an input string to permutation pattern(s) that are, for example, utilized in medical applications related to genes and proteins.

In the Advisory Action, the Examiner in fact acknowledges that the disclosed invention transforms the input permutation. The Examiner asserts, however, that there is only a renaming of the input and no discovery of permutation patterns.

Contrary to the Examiner's assertion, the claimed method does more than simply rename the input string; it performs a transformation. For example, the steps of determining which. if any, names in a plurality of sets of names have changed by selection of the new portion; and using changes in the names to determine the permutation patterns in claim 1 are similar, in some respects, to an advanced type of hashing function. Thus, not only the disclosed invention, but also the claimed invention, transforms the input data.

Applicants submit that each of claims 1-35 are in full compliance with 35 U.S.C. §101, and accordingly, respectfully request that the rejection under 35 U.S.C. §101 be withdrawn.

Examiner's response:

Nothing is being transformed. The word 'medical' is not mentioned within the specification.

13. In reference to the Applicant's argument:

Independent Claims 1, 20 and 29

Independent claims 1, 20, and 29 were rejected under 35 U.S.C. §102(b) as being anticipated by Floratos. Regarding claim 1, the Examiner asserts that Floratos teaches "using changes in the names to determine the permutation patterns" (page 457, CI: 26-43).

Applicants note that Floratos is directed to a different problem than the present disclosure. Floratos is directed to "identifying sequence similarity between a query sequence and a database of proteins." (Page 455, first paragraph) Floratos searches for an ordered sequence in a string. The claims of the present disclosure are directed to discovering permutation patterns. As would be apparent to a person of ordinary skill in the art, permutation patterns indicate that the patterns are related to a non-ordered set of characters. For instance, dictionary.com teaches that the permutations of (1,2,3) are (1,2,3) (2,3,1) (3,1,2) (3,2,1) (1,3,2) (2,1,3). Independent claims 1, 20, and 29 require using changes in the names to determine the permutation patterns.

Regarding the Examiner's assertion that "a specific ordered sequence can be seen as a single input of a permutation pattern," Applicants note that a "sequence" is defined as "the following of one thing after another." (See, dictionary.com) Thus, the example cited by the Examiner on page 26 of the present Office Action does not provide evidence that Floratos is directed to discovering permutation patterns.

Thus, Floratos does not disclose or suggest using changes in the names to determine the permutation patterns, as required by independent claims 1, 20, and 29.
De[p]endent Claims 2-19 21-28 and 30-35

Dependent claims 2-17, 21-26, and 30-35 were rejected under 35 U.S.C. §102(b) as being anticipated by Floratos.

Claims 2-19 and 30-31, claims 21-28 and 32-33, and claims 34-35 are dependent on claims 1, 20, and 29, respectively, and are therefore patentably distinguished over Floratos because of their dependency from independent claims 1, 20, and 29

for the reasons set forth above, as well as other elements these claims add in combination to their base claim.

All of the pending claims, i.e., claims 1-35, are in condition for allowance and such favorable action is earnestly solicited.

If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this application, the Examiner is invited to contact the undersigned at the telephone number indicated below.

Examiner's response:

Each 'permutation patterns' of applicant is disclosed by the algorithm which produces as output the complete set of all of the maximal (L, W) patterns that appear in at least K of the sequences in the set D of Floratos. (**Floratos,** p457 C1:26-43) Applicant argues that Floratos is not directed to discovering permutation patterns. The Examiner disagrees. The title of Floratos, 'A pattern based method for detecting sequence similarity' is equivalent to 'discovering permutation patterns' of applicant. The Applicant's position is the same words are not present, but it is the Examiner's position that the same meaning is present.

***Examination Considerations***

14. The claims and only the claims form the metes and bounds of the invention. "Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d, 1393, 1404-05, 162 USPQ

541, 550-551 (CCPA 1969)" (MPEP p 2100-8, c 2, l 45-48; p 2100-9, c 1, l 1-4). The Examiner has the full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

15. Examiner's Notes are provided to assist the applicant to better understand the nature of the prior art, application of such prior art and, as appropriate, to further indicate other prior art that maybe applied in other office actions. Such comments are entirely consistent with the intent and sprit of compact prosecution. However, and unless otherwise stated, the Examiner's Notes are not prior art but link to prior art that one of ordinary skill in the art would find inherently appropriate.

16. Examiner's Opinion: Paragraphs 14 and 15 apply. The Examiner has full latitude to interpret each claim in the broadest reasonable sense.

## ***Conclusion***

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

18. Claims 1-35 are rejected.

***Correspondence Information***

19. Any inquiry concerning this information or related to the subject disclosure should be directed to the Examiner Peter Coughlan, whose telephone number is (571) 272-5990. The Examiner can be reached on Monday through Friday from 7:15 a.m. to 3:45 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor David Vincent can be reached at (571) 272-3080. Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks,

Washington, D. C. 20231;

Hand delivered to:

Receptionist,

Customer Service Window,

Randolph Building,

401 Dulany Street,

Alexandria, Virginia 22313,

(located on the first floor of the south side of the Randolph Building);

or faxed to:

(571) 272-3150 (for formal communications intended for entry.)

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have any questions on access to Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

/P. C./

Examiner, Art Unit 2129

Peter Coughlan

11/25/2008

/David R Vincent/

Supervisory Patent Examiner, Art Unit 2129